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There is a VaR beyond usual approximations

A normal approximation is often chosen in practice for the unknown distribution of the yearly log returns of financial assets, justified by the use of the CLT (Central Limit Theorem), when assuming aggregation of iid observations in the portfolio model. Such a choice of modeling, in particular using light tail distributions, has proven during the crisis of 2008/2009 to be an inadequate approximation when dealing with risk measures; as a consequence, it leads to a gross underestimation of the risks. The main objective of our study is to obtain the most accurate evaluations of risk measures when working on financial data under the presence of heavy tail and to provide practical solutions for accurately estimating high quantiles of aggregated risks. It may also be useful for a better estimation of the capital when using Monte-Carlo simulations for which the convergence may be an issue.

We explore new approaches to handle this problem, numerically as well as theoretically, based on properties of upper order statistics. We compare them with existing methods, for instance with one based on the Generalized Central Limit Theorem.

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